

BALOONE BORNE OBSERVATIONS
OF
UPPER TROPOSPHERIC HUMIDITY

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OVERVIEW

- Instrument
- Instrument History
- Intercomparisons
 - Vaisala
 - Snow White
- Observation sites
- Observation plan
- Summary

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WATER VAPOR OBSERVATIONS:

- **GALAPAGOS:** San Cristóbal, Galápagos, 89.61°W, 0.90°S
 - **Payload:** Frost-point/Snow White/Vaisala/Ozone
 - **Launches:** Year 1: 2 campaigns with 3 soundings each
Year 2: 2 campaigns with 3 soundings each
biweekly Snow White/ozone
Year 3: 1 campaign with 3 soundings each
biweekly Snow White/ozone
 - **Additional:** Radiosonde every two days
- **HAWAII:** Hilo, HI, 155.06°W, 19.71°N
 - **Payload:** Frost-point/Snow White/Vaisala/Ozone
 - **Launches:** Year 1: 2 campaign1 with 3 soundings each
Year 2: 1 campaign with 3 soundings each
Year 3: biweekly Snow White/ozone
- **ARM/CART:** Central Facility, 97.49°W, 36.61°N
 - **Payload:** Frost-point/Snow White/Vaisala/Ozone
 - **Launches:** Year 1: 1 campaign with 3 soundings each
Year 2: 1 campaign with 3 soundings each
Year 3: 1 campaign with 3 soundings each
- **BOULDER:** Marshall Facility, 105.20°W, 39.95°N
 - **Payload:** Frost-point/ Vaisala
 - **Launches:** Year 3: 7 dedicated soundings

➤ ALL SOUNDINGS AT TIMES OF AIRS OVERPASSES

Frost-point Sounding

Balloon: 3000 gr night flight

Payload: Frost-point hygrometer
Snow White
Ozone Sonde

Ceiling : ~30 km, valved descent

Launch : Night (Snow White)
Unrestricted (Frost-point)



CU - NOAA/CMDL Frost-point Hygrometer

Vertical Range:

Lower troposphere to 28 km

Sensitivity:

Detection limit 0.7 ppmv

Accuracy : 10%

Launch Restrictions:

Can't pass rain clouds

Contamination:

Minimal on ascent

None on descent



Snow White Hygrometer

Vertical Range:

Lower troposphere to
below tropopause (?)

Sensitivity:

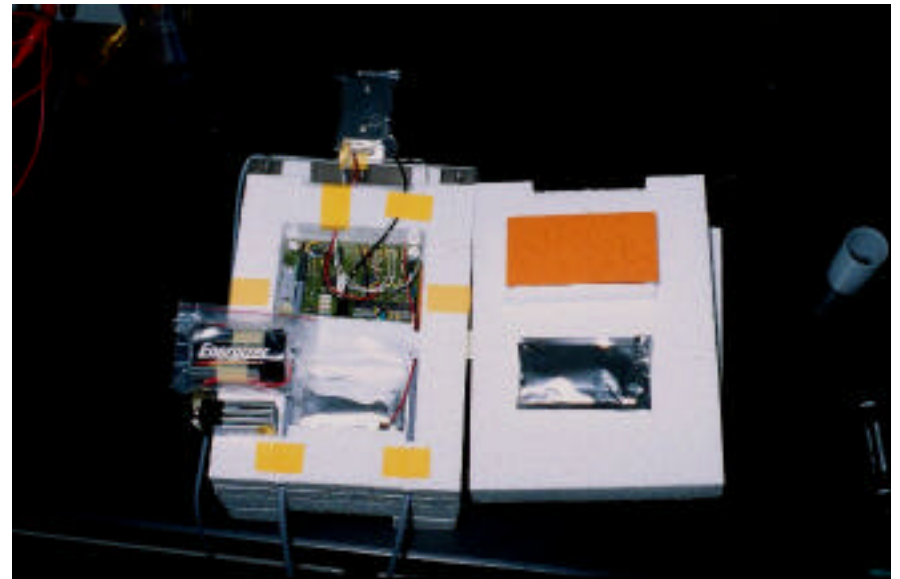
Detection limit 5 ppmv (?)
Frost-point depression 35°C (?)
Accuracy 0.1 °C (company spec.)

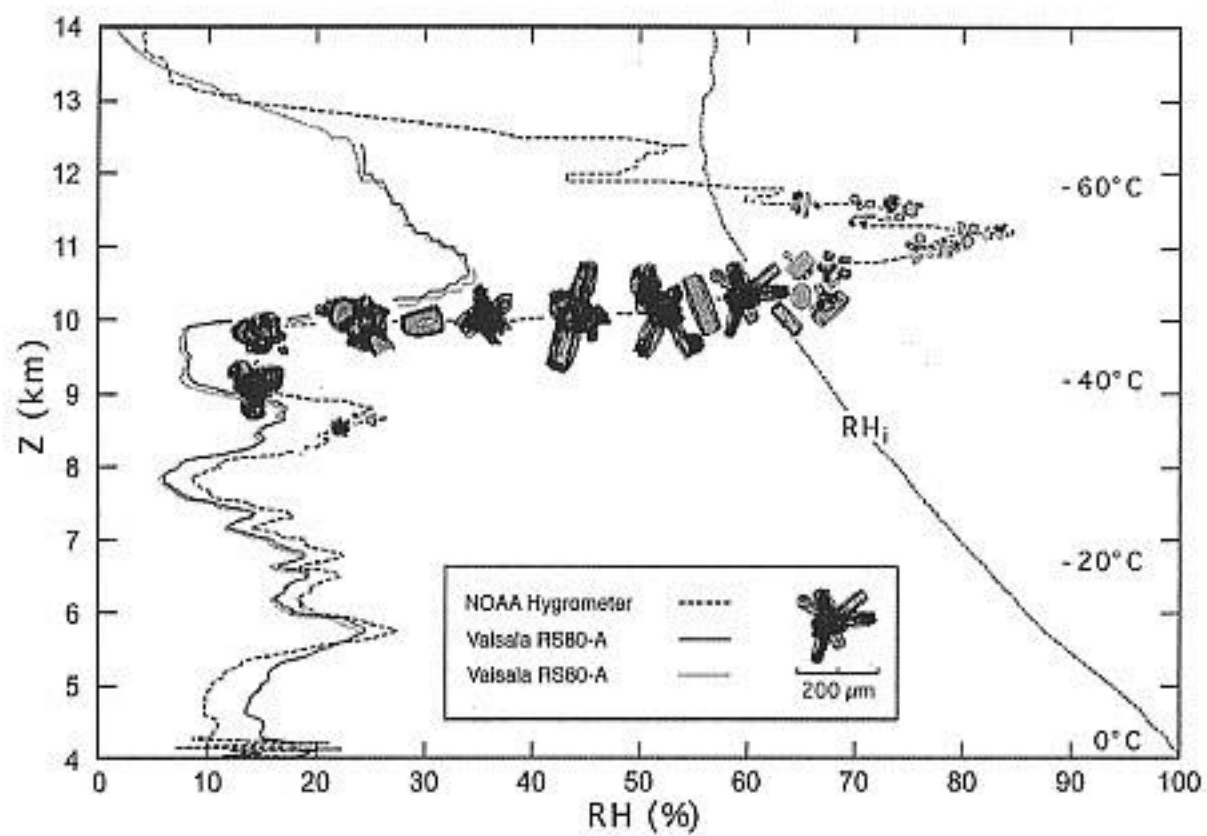
Launch Restrictions:

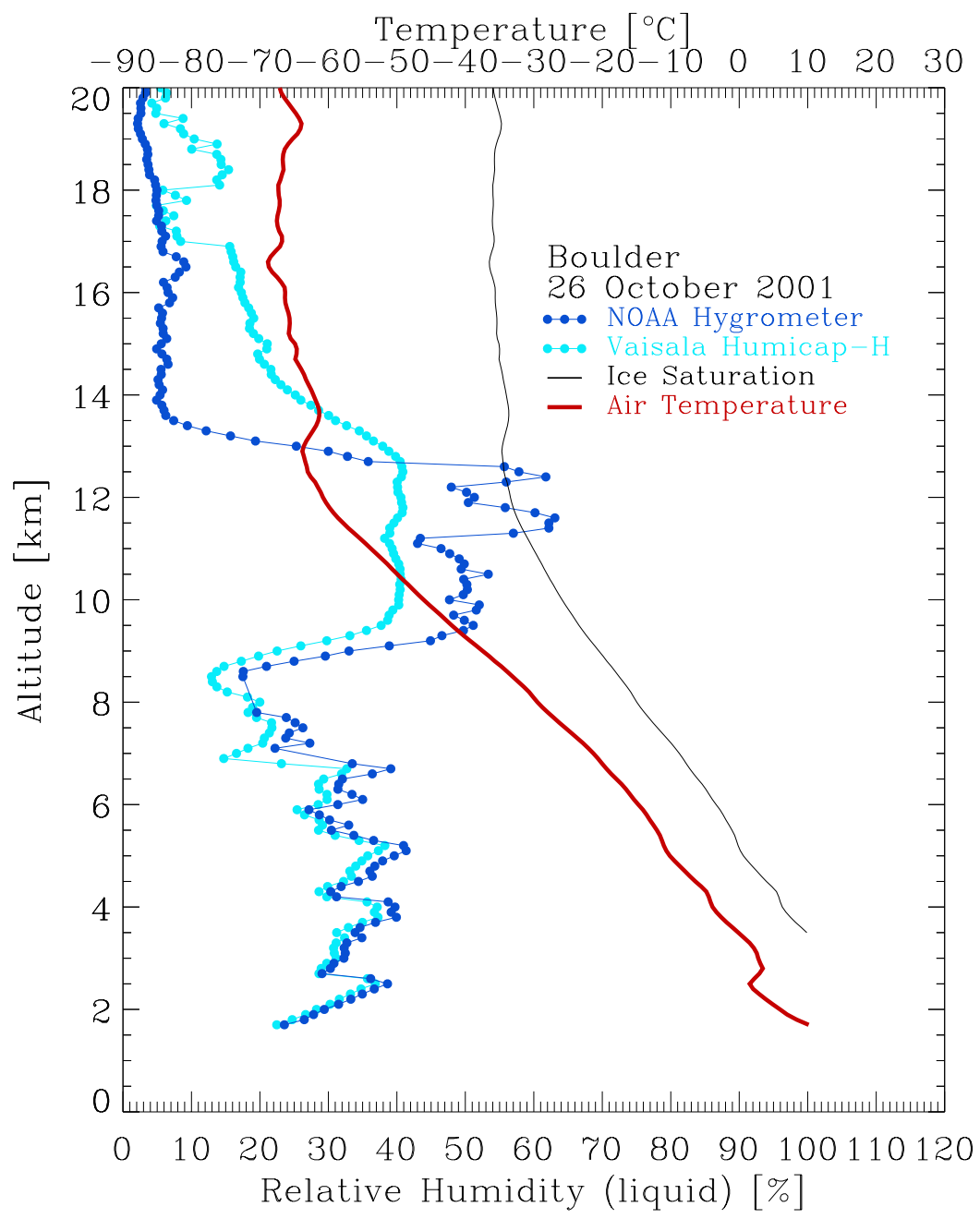
Night for highest vertical range
Can't pass rain clouds

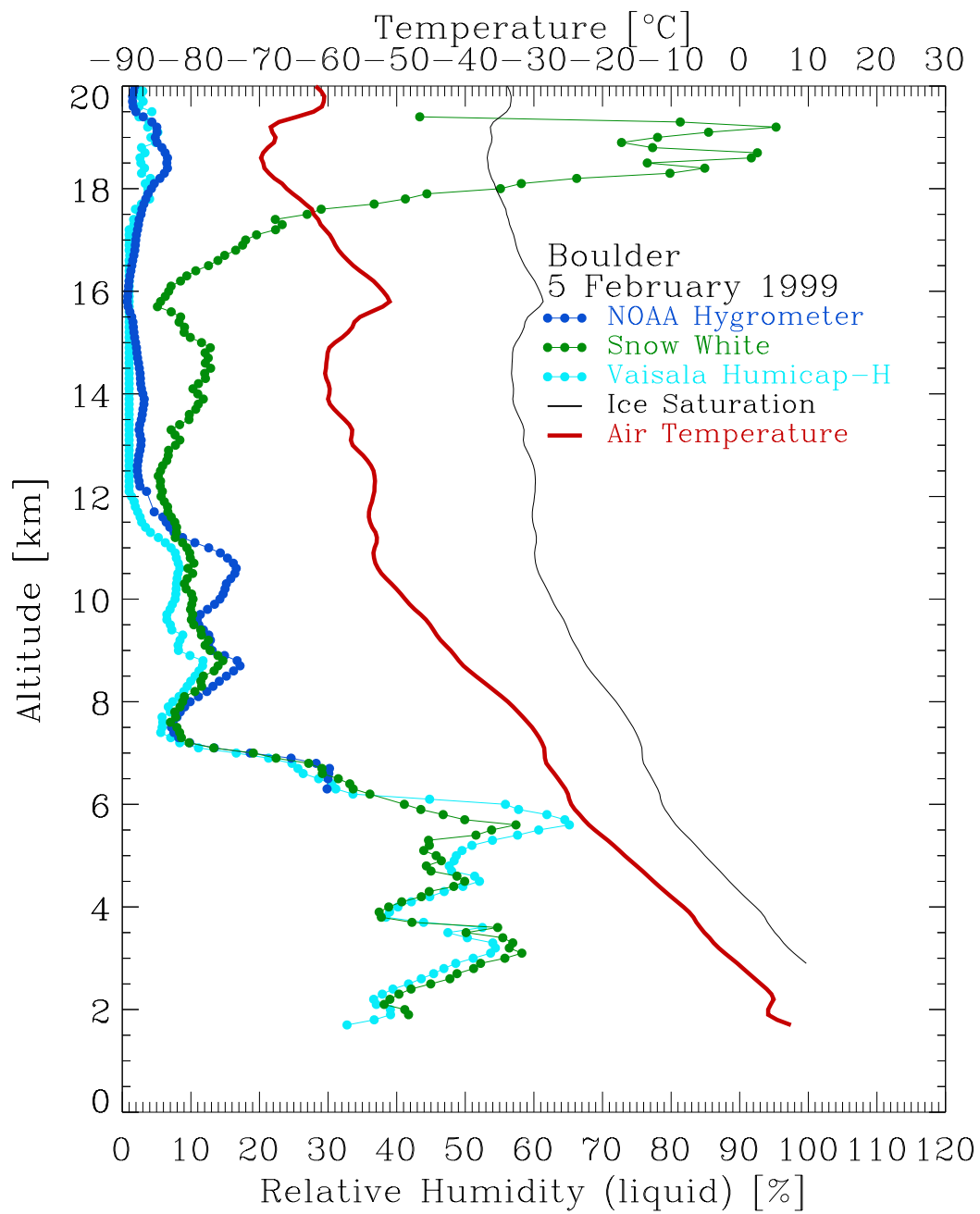
Contamination:

Minimal on ascent (?)
Possible on descent (?)









Hawaii Island

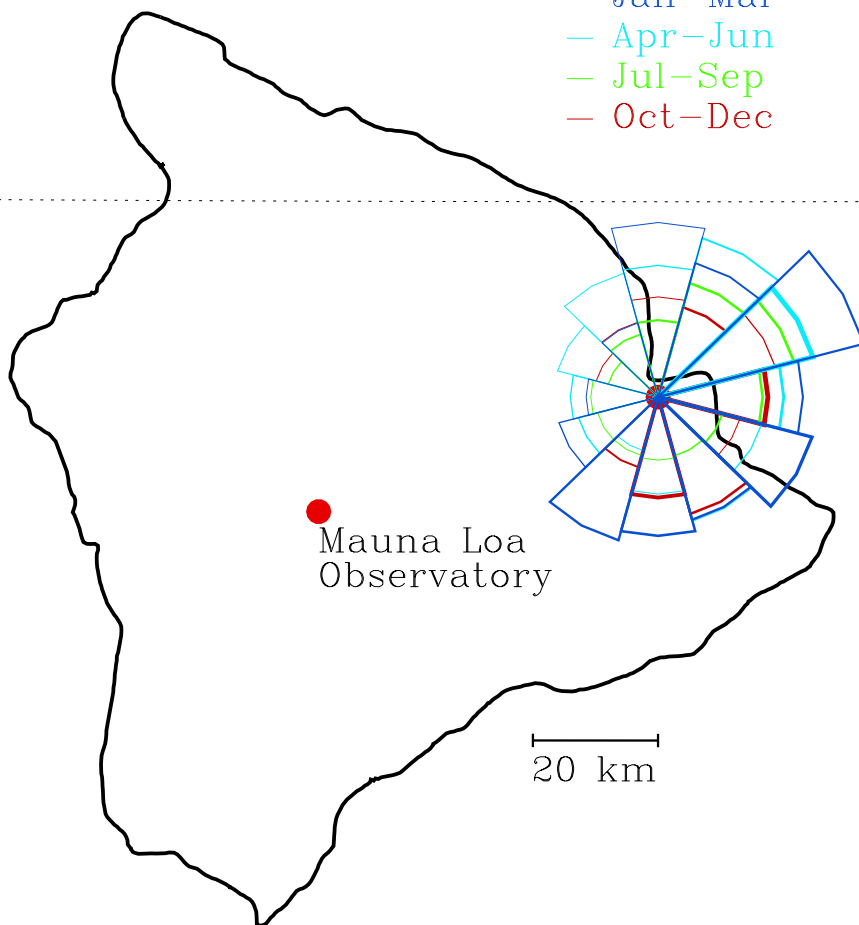
Location at 15 km

— Jan-Mar

— Apr-Jun

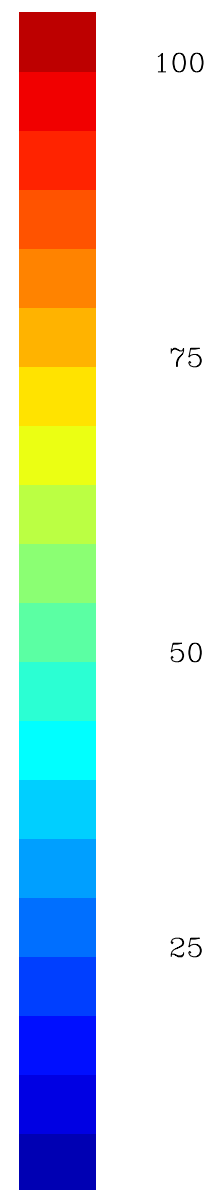
— Jul-Sep

— Oct-Dec



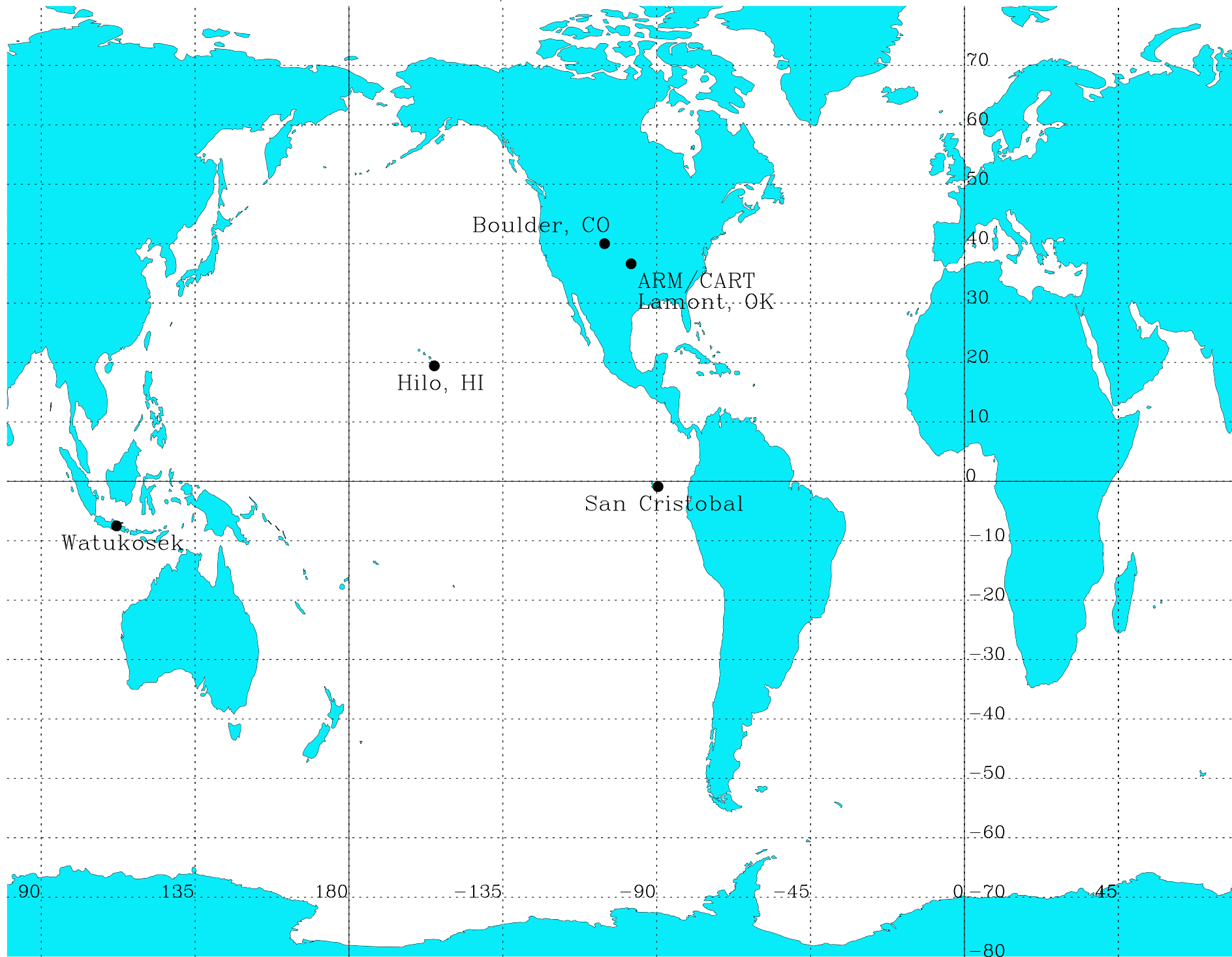
Mauna Loa
Observatory

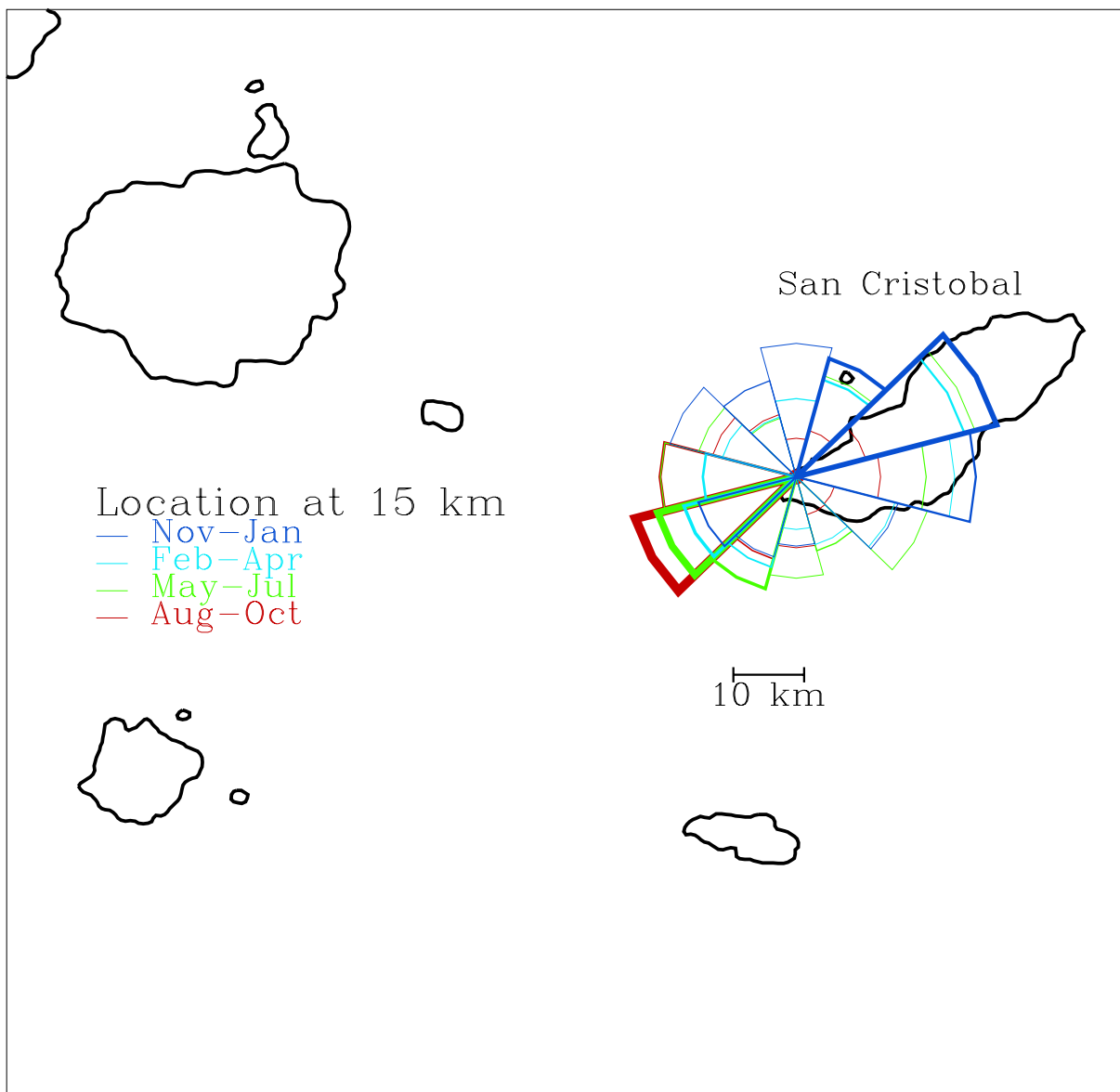
20 km



[%]

CU NOAA/CMDL Balloon Launch Sites





Relative Humidity over San Cristobal 1991 – 2001

